EARTH ROADS WORK

Necessary Tools and Machinery Needed for Building.

USE OF ELEVATING GRADERS

Machine May Be Operated Successfully With 25-Horsepower Tractor or Twelve Well-Trained Horses —Scrapers and Wagons.

(Prepared Specially by the United States Department of Agriculture.)

The use of elevating graders is sometimes desirable in the construction of earth roads. The essential features of this machine are a plow with a heavy moldboard, an elevating belt, a suitable frame for supporting the plow and belt, and driving and adjusting mechanisms for operating the belt and controlling the work. The plow loosens the material and throws it onto the belt, which conveys and deposits it either in the roadbed or wagons.

Elevating graders are adapted especially to building up embankments with material excavated from shallow borrow ditches along each side of the road. They also may be used to advantage in excavating long, shallow, through cuts and loading the material thus excavated into wagons for use in building up embankments at other points. The latter use, however, is restricted to situations where there is sufficient space to operate the grader and at the same time afford passageway for the teams and wagons to follow under the end of the belt to receive the successive loads as the grader is drawn forward.

Operating Elevating Grader.

It is customary to employ a traction engine for operating the elevating grader, though teams are used sometimes. Ordinarily, the machine may be operated successfully either with a 25-horse power tractor or with 12 well-trained horses.

The rate at which earth can be excavated with an elevating grader is relatively very high when conditions are favorable and the grader can be kept moving. But there are a number of rather complicated parts about such a machine which sometimes get out of order, and the work also is usually hampered by many unforeseen contingencies, such as "bogging" of the wheels, choking of the plow or the elevator belt, occurrence of buried stumps or stones in the excavation, etc. For these reasons the actual capacity of elevating graders, considered over a long period, seldom is more than about one-third or one-half the rated capacity, and where the material is loaded into wagons as it is excavated the actual capacity of the machine may be reduced still further. Elevating graders of the size used ordinarily in road work have a rated capacity of about 100 cubic yards per hour.

Use of Scrapers, Wagons, Etc.

To grade a road of any considerable length, no matter where it is located, usually will require a considerable amount of work with devices other than the grading machine and elevating grader. The latter machine, as previously explained, may be very economical for special conditions to which they are adapted. But these special conditions seldom prevail for more than comparatively short stretches of road without sections intervening which require that a relatively large volume of material be moved from excavation to embankment within a distance of only a few hundred feet. Figure 1 shows a typical cross section for earth roads, where the grading machine hardly could be used advantageously except for finishing the road surface. To accomplish work of this kind economically, the devices for loosening, loading and hauling the material must all be adapted to turning around quickly in a small space and, not infrequently, must be such as to be handled readily over very rough ground. Such implements as wagons, wheeled scrapers, drag scrapers and plows therefore should form a part of the equipment for practically all road-grading projects.

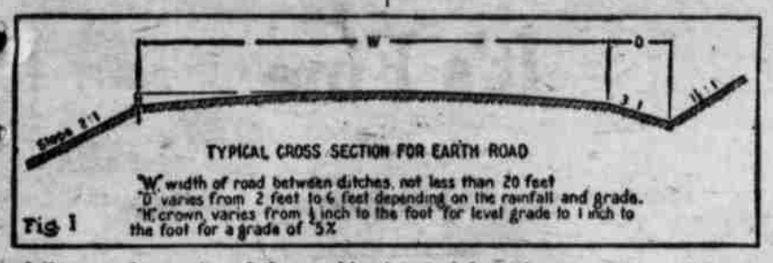

Fig. 1

The choice of proper implements to employ in moving material from excavation to embankment depends, first, on the nature and quantity of the material to be moved, and, second, on the length of haul. In general, where the material consists of earth it is loosened with plows and the economical method of hauling is fixed by the haul length about as follows:

For lengths of haul not exceeding 150 feet, drag scrapers; for lengths of haul between 150 feet and 600 feet, wheeled scrapers; for lengths of haul above 600 feet, wagons. Where the material consists of solid rock it must be loosened by drilling and blasting and practically always is hauled in wagons or carts, regardless of the haul length.

Types of Plows Used.

Two types of plows commonly are used in road grading. One is the type generally used for loosening ordinary soils, while the other is used for breaking up hardpan, lode road surfaces and other earth unusually difficult to loosen. Either type is drawn by four horses, or in some cases by a traction engine, and is operated by three men, including the driver. Such plows average about 150 pounds in weight and sell at an average price of from $12 to $18, but heavier plows of this type range in cost up to about $30. With average soil conditions they may be made to turn a furrow about 7 or 8 inches deep and from 8 to 10 inches wide. The hardpan plows vary considerably in weight and selling price but cost more than the turn plows. One reason for the higher cost is that the points must be made of a very high grade of steel in order to be durable.

Drag scrapers are made in 1-horse, 1½-horse and 2-horse sizes, which have respective rated capacities of 3, 5 and 7 cubic feet. Drag scrapers have an average weight, when empty, of from 75 to 100 pounds, and an actual capacity of about three-fourths the rated capacity. The price, f. o. b. factory, averages from $4 to $6 per scraper.

In operating drag scrapers the drivers also may load and empty the scraper, but frequently it is economical to provide additional laborers for this purpose. With a haul length of 100 feet and the teams moving steadily, one laborer should be able to load or empty and spread the material for about three scrapers. For scraper work to be effective the material to be excavated must be thoroughly loosened by the plows and should be free from large roots or stones. Where such obstructions occur time is saved by having them removed by hand during the process of plowing.

The average small organization for carrying on road-grading work with drag scrapers is made up about as follows:

Force:
1 foreman.
4 to 6 scraper drivers.
2 laborers for loading scrapers.
2 laborers for dumping and spreading.
1 driver for plow.
1 laborer to hold plow.
1 laborer for trimming shoulders, etc.
4 to 6 two-horse teams for scrapers.
1 or 2 two-horse teams for plow.
Total, 1 foreman, 14 laborers, and 7 teams.

Tools:
6 drag scrapers (capacity 5 cubic feet).
1 road plow.
2 picks.
2 axes.
2 mattocks.
3 shovels.

The force employed should vary somewhat with the haul length, which is usually between 25 feet and 150 feet. Under average conditions an organization such as that described above should move from 300 to 350 cubic yards of earth per 10-hour day.

Objectionable Feature.

An objectionable feature of drag-scraper work is that the embankments tend to settle very irregularly. The reason is that the successive loads are not spread out uniformly as they are dumped, but are deposited as a succession of rather compact cores with the intervening spaces consisting of comparatively loose material. The loose material settles more than the compacted spots, and this unequal settlement produces pockets in the surface which hold water and gradually become deepened under the action of traffic.

Use Wheeled Scrapers.

Wheeled scrapers are used to a greater extent in road grading than either drag scrapers or wagons. The reason for this is that in road work the haul length falls, more frequently than otherwise, within the limits for which wheeled scrapers are economical. Several different sizes of such scrapers are in ordinary use, but the size employed most commonly has an actual load capacity of from 11 to 15 cubic feet, according to how heavily the load is heaped. Scrapers of this size ordinarily sell for from $35 to $50 f. o. b. factory.

In operating wheeled scrapers the material is loosened by plowing, in the manner already described, and is loaded by the scooping action of the scraper. Two horses usually are sufficient to draw the scraper after it is loaded, but a second team, called a snatch team, is hitched in at the front of the tongue to assist in loading. The snatch team should consist of either two or three horses, according to the character of the material, and one snatch team should serve several scrapers. The loading and dumping of the scrapers are done by laborers provided for that purpose and not by the drivers.

A small organization for carrying on graded work with wheeled scrapers may be made up about as given below:

Force:
1 foreman.
6 to 11 drivers.
1 laborer for plowing.
2 laborers for loading scrapers.
2 laborers for dumping and spreading.
1 laborer to trim slopes, etc.
1 two-horse team for plow.
4 to 8 two-horse teams for scrapers.
1 or 2 two-horse snatch teams.
Total: 1 foreman, 17 laborers, 11 teams.

Tools:
8 wheeled scrapers (capacity 11 to 15 cubic feet).
1 road plow.
2 picks.
2 mattocks.
2 axes.
3 shovels.

The force employed should vary with the haul length, usually from 150 feet to 600 feet. Six to eight scrapers should be employed where the haul exceeds 250 feet. Where necessary one of the snatch teams may be used to assist the plow team.

Such an outfit should move from 200 to 250 cubic yards of earth per 10-hour day.

THE DIFFERENCE

By A. C. NEW.

Walter Brent checked his satchel, gave another impatient glance at the dispatch board and walked across the deserted station to the news stand.

"See that New York train's an hour and a half late," he remarked cryptically to the drowsy proprietor, who nodded a sleepy assent. "Give me a copy of the Tattler. Is there any eating place near here?"

"'Bout half a block down the street," answered the other briefly, handing Brent the magazine.

Brent then walked out of the station. Raising his umbrella, for it was raining hard, he trudged down the quiet street, until he halted in front of a dimly-lit lunchroom. He paused a moment in surprise, for a very pretty and dainty young girl was standing on tip toes extinguishing the front light, but as he entered she left the light burning and smilingly demanded his order, then disappeared in the direction of the kitchen in the rear. Brent settled himself in a chair and opened the magazine, and did not notice a young man, who appeared at the rear door, scowled at him and then withdrew again.

"Huh!" grunted the latter in a low tone to the young girl at the stove. "Looks like he's settled down for a stay. I was goin' to close down after Joe came. What'd he order, sis?"

"I'm glad he came," answered the girl, dropping an egg into the steaming pan and ignoring his question. "Now I won't have to wait on that bum."

A bang in the dining room outside was heard and the young man turned on his sister quickly.

As Joe lurched into the lunchroom, slunk into a seat, and, grasping in his hands a salt cellar, he beat a tattoo on the table.

Soon the girl emerged from the kitchen with Brent's order, and as she passed Joe she stepped out of his way as he made a grab for her arm. Brent noticed her agitation as she set the dishes down in front of him. In response to her polite and musical query if he would have anything else, he absently gave a negative nod and she started back for the kitchen.

This time, as she passed the drunk's table, she was not quick enough to dodge his restraining hand, and he pulled her over to him.

"Please, Joe," she pleaded.

"A kiss—a sweet little kiss," came the maudlin answer. "C'mon now. Ah, now, you don't wanta scream! It'd ruin your place, y' know it."

"Wait!" pleaded the girl, her face ashy-white. "I've got to get this gentleman something. When I come back I'll kiss you." And she darted away to the kitchen.

Ten minutes slipped by before she rose hastily from her chair and hurried into the lunchroom. At the door she paused in astonishment, for both the stranger and Joe were gone! Returning to the kitchen she roused her brother, and they ran together to the door, but the stranger, with his scarcely tasted meal yet unpaid for, was nowhere in sight, nor was Joe. But the quest of the watchers was brief, for a new gust of rain drove them inside, and locking the doors they extinguished the lights and retired.

Half an hour later, just as the girl had slipped off to sleep, a loud rapping at the front door beneath her room summoned her, attired in a simple dressing gown, downstairs. At the front door a beefy policeman accosted her.

"Mis' Lucy," he said, shaking off the rain, "we got a young guy up at th' lockup, who says he owes yeh forty cents. Here it is," and the officer slipped some coins in her hands. "Says he was eatin' in here 'while ago. Big, handsome young feller, brown hair, an' all dressed up. Know 'im?"

"Y—es," she faltered. "But why—is he—locked up?"

"Fer fightin'," was the brief reply. "I caught 'em down th' street. He had his coat around Joe's mouth and was beatin' th' life outa him—you know Joe, th' one that runs a taxi. He's at th' hospittle."

At the mention of "Joe," the color receded from Lucy's face, leaving it deathly pale.

"Did—do you know what they were fighting about?" she inquired nervously.

"'Bout a woman, I guess," replied the bluecoat. "Th' young un' was callin' Joe a skunk fer mistreatin' a fine little lady. Joe never answered. Never had no front teeth left t' answer with."

Lucy thought quickly.

"Mr. Giles," she asked, hurriedly. "How much collateral do you want to let that young man out tonight?" Then she checked a reply from the policeman's lips. "No, I mean it. He—he came in here to kill time till his train came. He—I know he's too nice to be locked up. How much? Can I pledge this place? It's mine."

The next day Brent rushed into the restaurant.

"Miss Marston—Lucy," he said, reaching across the counter and taking her hands in his. "I thank you for that. But don't thank me. I couldn't let the beast kiss you—and I couldn't let him ruin your place. So I dragged him out first, then beat him. But—I—I can't blame him much for wanting to kiss you. I'd like to make a life job of that myself. How about one now—for collateral?"

"Well," she whispered, "you're different. I wouldn't mind kies—," but he stifled her sentence with his lips.

NOTED AUSTRALIAN COMING

Sir George Reed, high special commissioner from Australia and one of the foremost orators of the British empire, who is coming soon to America to lecture on "Anglo-American Relations."

"Whistle Nothing."

Willie, a Southern boy, was playing in the back yard when he came into possession of a green persimmon. He ate it and it puckered his mouth in a most grotesque fashion. Becoming excited over the situation, he ran into the house, where his little sister was playing on the floor. 'Oh, mother, look at Willie; I think he is going to whistle," shouted the little girl. "Whistle nothing," said Willie. "Can't you see I'm p'isened?"

Glass Making an Old Art.

Fragments of wine vases as old as the Exodus have been discovered in Egypt. The art of glass making was probably known to the ancient Assyrians. In the New Testament glass is alluded to as an emblem of brightness (Rev. 4:6; 15:2; 21:17).

A. C. Hunter President

The Kentucky Sunday School Association has adjourned its session at Maysville and will meet next year at Ashland. The association selected A. C. Hunter, of Versailles, as president for the ensuing year, with George A. Joplin, of Louisville, as secretary, and Clarence Watkins, of Louisville, treasurer.

Night Air in Towns.

It is a mistake to suppose that night air in towns is unhealthy. In most cases it is purer between ten at night and six in the morning than at any other part of the 24 hours.

Oldest Bird Known.

The oldest bird known is called the archeopteryx. That is a Greek word, which really means "ancient wing." It was an extraordinary bird. It had a long tail, not all feathers as a bird's tail is now, but like a lizard's tail, long and thick, with bones and flesh, and with feathers growing from it. It had two legs, with which it could walk or perch in the trees, but it had two other limbs like hands, which it probably used to climb about the trees instead of flying from bough to bough, as birds now do. It had a curious eye fitted with a sort of armor shield, as the reptiles have, and its beak was armed with great strong teeth. There is no such bird as this now.

James Whitcomb Riley's Prayer.

I pray not that men tremble at my power of place and lordly sway, I only pray for simple grace to look my neighbor in the face full honestly from day to day.—James Whitcomb Riley.